

Claims

1. A method of reducing both NOx and particulates in the exhaust of hydrocarbon-burning, internal combustion engines, comprising:

5 providing at least one porous, interdigitated ceramic filter including a plurality of inlet channels and a plurality of outlet channels contiguous with said inlet channels, and having NOx adsorbent material and NOx reduction catalyst disposed on or in at least one of (a) on the surfaces of said channels or (b) within the pores of said filter or (c) within the material of which said filter is composed; and

10 alternatively providing to each of said inlet channels said exhaust and syngas in an interleaved fashion, thereby to regenerate said NOx adsorbing material and to catalytically decompose particulates trapped in said filter.

2. A filter apparatus for reducing both NOx and particulates in the exhaust of hydrocarbon-burning, internal combustion engines, comprising:

5 at least one porous, interdigitated ceramic filter including a plurality of inlet channels, each having an inlet, and a plurality of outlet channels contiguous with said inlet channels, and having NOx adsorbent material and NOx reduction catalyst disposed on or in at least one of (a) on the surfaces of said channels, or (b) within the pores of said filter or (c) within the material of which said filter is composed; and

10 means for alternatively providing to each of said inlet channels said exhaust and syngas in an interleaved fashion, thereby

to regenerate said NOx adsorbing material and to catalytically burn particulates trapped in said filter.

3. Apparatus according to claim 2 wherein:

each of said inlet channels has an inlet in a plane with the inlets of all other ones of said inlet channels;

and said means comprises:

5 a gas inlet distributor having two chambers adjacent said plane to direct gas in one of said chambers into ones of said inlet channels adjacent said one chamber, and to direct gas in another of said chambers into ones of said inlet channels adjacent said other chamber;

10 an engine exhaust gas inlet disposed to admit engine exhaust gas into a first one of said chambers;

a syngas inlet disposed to admit syngas into a second one of said chambers; and

15 rotation means for providing relative rotation between said filter and said distributor.

4. Apparatus according to claim 2 wherein:

said inlet gas distributor is stationary; and

said rotation means comprises means for rotating said filter.

5. Apparatus according to claim 2 wherein:

said filter is stationary; and

said rotation means comprises means for rotating said inlet gas distributor.

6. Apparatus according to claim 5 wherein:  
said inlet channels comprise annular channels receiving  
respective gas from corresponding gas inlet ports.

7. Apparatus according to claim 2 wherein:  
there are two said ceramic filters;  
and said means comprises:  
valves operated so as to direct exhaust to a first one of said  
filters while directing syngas to a second one of said filters,  
alternately with directing exhaust to said second filter while directing  
syngas to said first filter.